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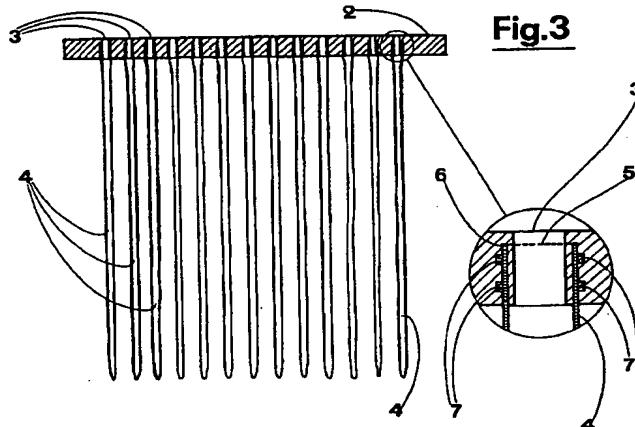
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### (54) A sack filter

(57) The invention relates to a sack filter comprising a support plate (2) made of a plastic material such as polyurethane, on a surface of which a plurality of apertures (3) is afforded. A plurality of sacks (4), made of a filtering material and each of which is associated to an aperture (3), is each provided with a mouth (5) facing an aperture of the plurality of apertures (3). An edge (6) of a mouth (5) of each of the plurality of sacks (4) is embedded in the plastic material of the support plate (2) at a perimeter zone of a respective aperture (3), such that the sack (4) is anchored to the support plate (2).



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## Description

The prior art relating to filters for the extraction of dusts from gases comprises sack filters essentially constituted by a container enclosing a battery of sacks made of a filtering material, which sacks are arranged reciprocally parallel and are mounted on a square support plate which doubles as a lid for the container. The edge describing the mouth of each sack is fixed to a frame in turn fixed to the support plate. The plate exhibits a plurality of longitudinal parallel apertures to each of which a frame of a single sack is fixed. Further, a rigid net structure is usually arranged internally of each sack to prevent the walls thereof from coming into reciprocal contact without for that obstructing in any way the passage of the filtered gas.

This gas (dusty air, smoke etc.) is introduced into the container and, after filtering, exits from the sack mouths; the filtered detritus is collected at the bottom of the container.

Known-type sack filters of the above-described type present, however, some drawbacks.

A first of these is that the available filtering surface, in relation to the overall filter mass, has an upper limit which depends on constructional factors, as the support plate can only bear a certain quite small number of frames, and therefore only a similarly limited number of sacks.

Secondly, known-type filters are constructively complex, expensive and laborious to manufacture.

The main aim of the present invention is to obviate the above-mentioned limits and drawbacks in the prior art by providing a sack filter, constructionally simple and economical, which is provided with an air-contact surface per unit of volume which is larger than that of existing filters.

Some advantages of the present invention are its compactness, its simplicity of manufacture and installation, the fact that sacks can be fitted very closely ranked in relation to the size of the support plate therefor, the fact that a single sack can be closed (when worn or broken) without significantly compromising the total delivery rate and functionability of the filter.

The invention also advantageously enables the sacks to be mounted on the support plate at a reciprocal distance which is the minimum distance below which free air passage would not be possible between one sack and a next; below such limit the density of sacks would cause a drastic reduction in the volume of air filtered.

These aims and others besides are all attained by the filter of the invention, as it is characterized in the claims that follow.

Further characteristics and advantages of the present invention will better emerge from the detailed description that follows, of an embodiment of the invention, illustrated in the form of a non-limiting example in the accompanying drawings, in which:

figure 1 shows an exploded schematic perspective view of the filter;

figure 2 shows a schematic frontal view of the sack support plate;

figure 3 is a section made according to line III-III of figure 2.

With reference to the figures of the drawings, 1 denotes in its entirety a sack filter, comprising a rectangular support plate 2, on which surface a plurality of parallel narrow and elongate apertures 3 are afforded. The support plate 2 is made of a plastic material which is stably solid in atmospheric conditions, for example polyurethane. The filter 1 comprises a plurality of sacks 4, flat and reciprocally parallel, each associated to an aperture 3, each having a mouth 5 facing said aperture 3 and being made of a filtering material.

The edge 6 of the mouth 5 of each sack 4 is embedded in the material of the support plate 2 at a perimeter zone of a respective aperture 3, such that the sack 4 is solidly anchored to the support plate 2. The support plate 2 and the sacks 4 thus form a single piece which can be manufactured extremely simply in comparison to sack filters of known type, for example by moulding or casting of the plastic material.

To obtain a better anchoring of the sacks to the support plate 2, as well as to prevent lacerations of the apertures 3 in proximity of the anchoring zone, the embedded edge 6 is preferably perpendicular to the support plate 2 and parallel to the walls describing the relative aperture 3 on the support plate 2. The depth to which the edge 6 is embedded, measured normally to the walls of the aperture 3, is about the same as the breadth of the filtering cloth of the sack 4.

The embedding of the edges 6 of the mouths 5 of the sacks 4 into the plastic is realized, for example, by means of insertion of said edges 6 into the moulding cavity of the die for the support plate 2, before molten plastic is introduced into the die. After solidification of the plastic material, the sacks 4 are solidly anchored to the support plate 2 material. To enhance the anchoring between the material of the support plate 2 and the edges 6 of the sacks 4, the sacks 4 exhibit projections 7, constituted for example by metal bosses solidly fixed to the material of the sacks 4. To improve still more the anchoring of the sacks to the plastic material, once the support plate 2 has solidified, further fixing means, such as metal clips, can be applied.

The rectangular support plate 2 is mounted on a container 8 provided with an inlet 9. The support plate 2 functions as a lid for the container 8.

The battery of sacks 4, when the support plate 2 is mounted on the container 8, is contained internally of the container 8. A rigid net structure 10 is arranged internally of each sack 4 to prevent the walls of the sack 4 from reciprocally contacting, without at the same time obstructing the passage of the filtered air. Also arranged internally of the sack 4 are means 11 for keeping the sacks 4 stretched and elongate, which means 11 are

operatively associated with the ends of the sacks 4 opposite to the mouths 5 thereof.

The filter 1 further comprises a plurality of lids 12, which can be used to close one or more of the apertures 3 when necessary.

During functioning, the gas to be filtered (smoke, dusty air etc.) is introduced internally of the container 8 through the inlet 9, and exits, after filtering, through the mouths 5 of the sacks 4.

Thanks to the single unified structure formed by the support plate 2 and the battery of sacks 4, a high number of sacks 4 can be mounted on the support plate 2, so that a large filtering surface is obtained in relation to the total volume of the filter 1.

Obviously it is still necessary to leave a free space between one sack 4 and another sufficient to allow passage of the air to be filtered. It is, however, also true that with the present invention this minimum free space no longer depends on constructional reasons deriving from the considerable lateral mass of the frames used up to the present day for supporting the single sacks, but only on the space necessary for the free passage of the air. The frames previously used do not in fact figure in the present invention: indeed, it can be stated that one of the most important advantages of the present invention is the fact that with respect to the prior art the filter frame is not present, its sack-supporting role having been obviated by the fact of embedding a portion of the sacks in the plastic material of which the support plate 2 is made - a fact which also enormously simplifies manufacture of the filter.

Given the high number of filtering sacks 4, in cases of breakage or wear of one or more sacks 4, it is possible to deactivate such sacks 4 by closing the relative apertures 3 with the lids 12, without causing a resulting significant loss of total potential of the filter.

### Claims

1. A sack filter, comprising: a support plate (2) on a surface of which a plurality of apertures (3) is arranged; a plurality of sacks (4), each of which is associated to an aperture (3) of the plurality of apertures (3), which sacks (4) are made of a filtering cloth and each of which sacks (4) is provided with a mouth (5) disposed in a position facing said aperture (3); characterized in that an edge (6) of said mouth (5) of each of said sacks (4) is embedded in a material of which said support plate (2) is made, at a perimeter zone of the aperture (3), such that said sacks (4) are solidly anchored to said support plate (2).
2. A filter as in claim 1, characterized in that said support plate (2) is realized in a plastic material which is stably solid in atmospheric conditions.
3. A filter as in claims 1 or 2, characterized in that the edge (6) of the mouth (5) of each of the sacks (4),

which edge (6) is embedded in the material of said support plate (2), is provided with projections (7) for enhancing an anchoring between said edge (6) and the plastic material of the support plate (2).

4. A filter as in any one of the preceding claims, characterized in that it comprises a plurality of lids (12) conformed in such a way as to close one or more of said apertures (3) should this be required.
5. A filter as in any one of the preceding claims, characterized in that the edge (6) of the mouth (5) of each sack (4), which is embedded in the material of the support plate (2), is perpendicular to the support plate (2) and parallel to the walls describing the apertures (3) on the support plate (2).
6. A filter as in claim 5, characterized in that a depth to which said edge (6) is embedded in said support plate (2), measured in a normal direction to said walls describing said apertures (3), is of about a same measurement as a breadth of a filtering surface of said sack (4).

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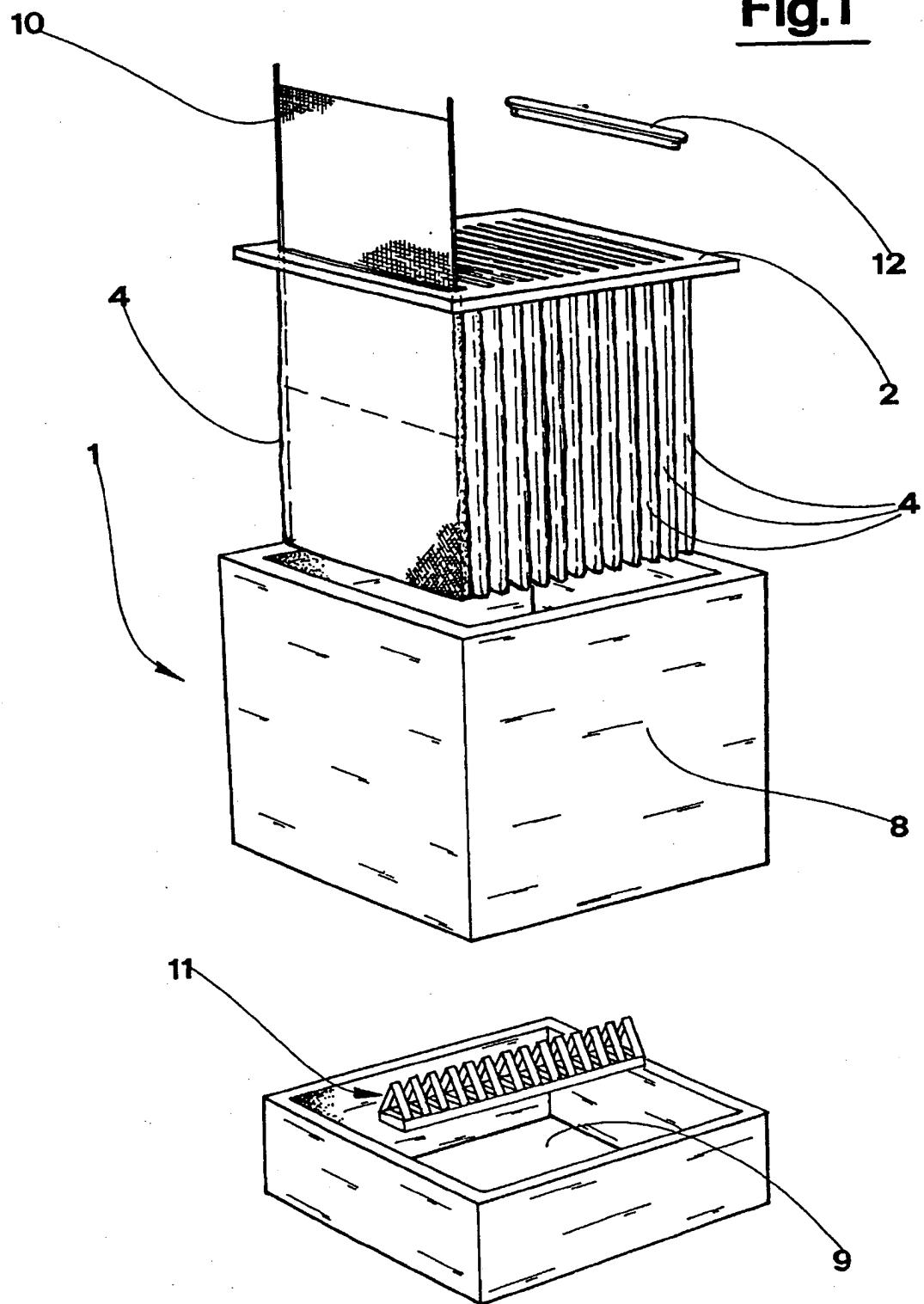
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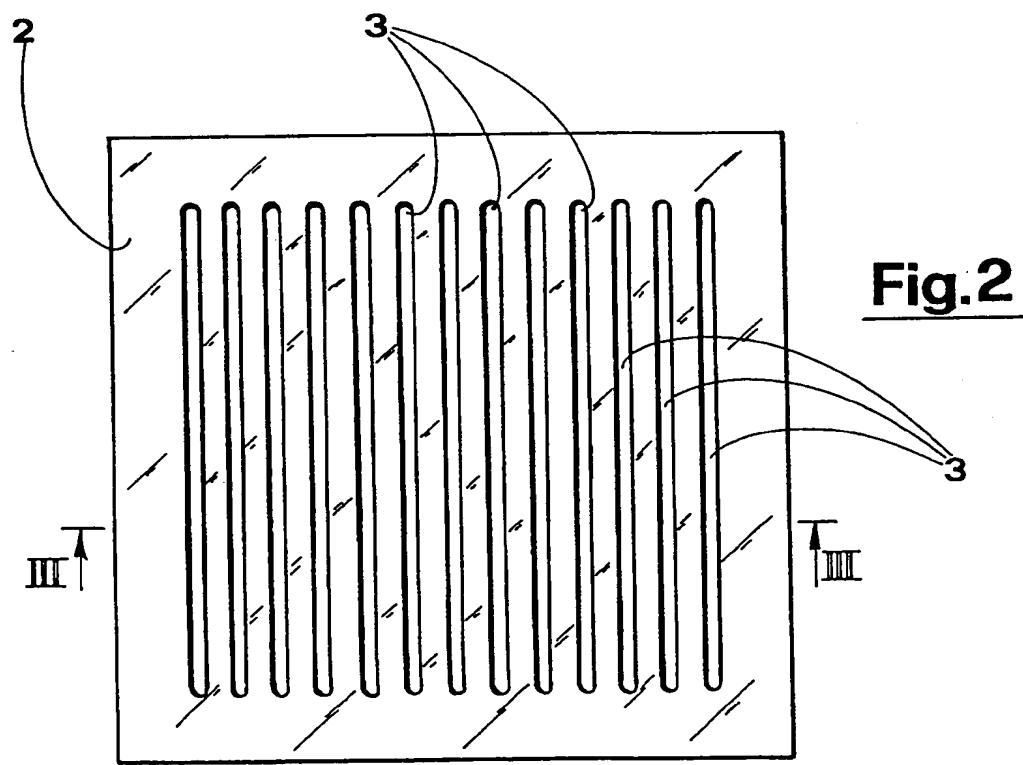
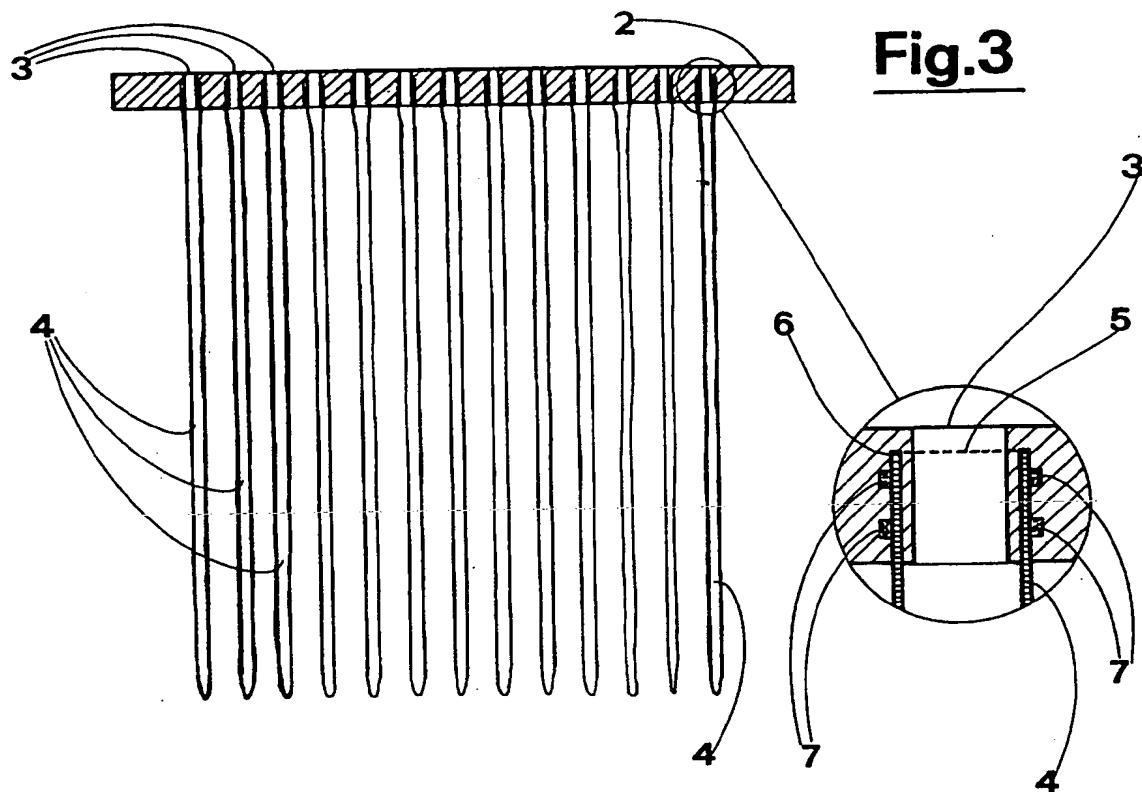
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**Fig.1**







## EUROPEAN SEARCH REPORT

Application Number  
EP 96 10 7006

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
Y	FR-A-2 325 414 (CARL FREUDENBERG) * claim 1; figures 1,2 *	1,2,5,6	B01D46/00 B01D46/06
Y	DE-U-71 40 425 (GEBRÜDER TROX GMBH) * claim 1; figures 2-4 *	1,2,5,6	
A	DE-A-41 11 789 (J.JUNKER) * claim 1; figure 4 *	1,3	
A	FR-A-2 318 669 (AIR INDUSTRIE) * claim 1; figures 1,4 *	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B01D
<p>The present search report has been drawn up for all claims</p>			
Place of search	Date of completion of the search	Examiner	
BERLIN	18 October 1996	Bertram, H	
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
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